

BEST PRACTICE PROGRAMME

Good Practice Guide

29

This leaflet describes a range of simple "good housekeeping" measures that schools can take to reduce their energy use.

The introduction of Local Management of Schools offers a real incentive to cut energy costs, since any savings can now go directly to the school, to be spent elsewhere — on more books and equipment for example.

Worthwhile reductions in energy consumption can be achieved in your school with its existing equipment and buildings, **without any additional financial investment.**

There are many reasons why "good housekeeping", e.g. switching off lights, turning off taps, etc, is a good way to start saving energy and there are very few, if any, buildings where no savings can be made. Good housekeeping:

- requires no capital investment
- can be put into operation straight away
- takes very little time — many tasks take less than a minute
- gives cost, energy and environmental benefits that start immediately.

Identifying good housekeeping measures is one thing, getting staff to change lifelong habits, and pupils to follow good advice, is another. The long term objective in motivating staff and pupils must be to change attitudes and energy using habits gradually so that the prudent use of resources

becomes an instinctive part of everyday behaviour.

Good housekeeping is not a "do it and forget it" exercise. Monitoring and checking of temperatures, lights, meters, etc., need to be done at regular intervals. Staff and pupils may require periodic reminding to maintain interest and motivation.

There is no magic solution. The watchword is co-operation, and seeking the active involvement of as many people as possible. Aim to capture their imagination and regularly publicise how much the savings are benefitting the school, and the environment. There are many different ways to reward success.

Other Guides in this series recommend the nomination of a "School Energy Manager", who might be a teacher, caretaker or parent, to coordinate progress. The involvement of pupils, perhaps as "Form Energy Monitors" is also recommended.

Where can Energy be Saved?

Schools spend almost equal amounts on fossil fuels (for heating and hot water) and electricity (for lighting and power). Some examples of where good housekeeping can cut out waste and improve the efficient use of both fossil fuels and electricity are given in the following pages. Savings can be made in all areas of energy use.

GOOD

HOUSEKEEPING

IN SCHOOLS

A GUIDE FOR SCHOOL STAFF,

GOVERNORS AND PUPILS



Simple good housekeeping can cut 10% or more off your energy bill



Energy Efficiency Office
DEPARTMENT OF ENERGY

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Heating

The cost of fuel used for heating is normally the largest single part of a school's energy bill. There are a few simple steps that, if followed, can result in valuable savings in your heating bill, often as high as 20%, if little attention has been paid to the heating system in the past:

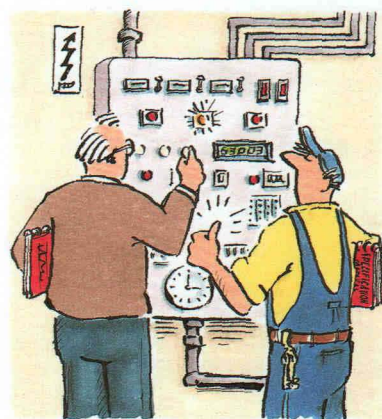
- Check that the heating system does not come on when the school is unoccupied, e.g. at weekends and holiday periods. (Note that provision needs to be made for frost protection in cold weather).
- Aim to keep to the room temperatures specified in the table below. Overheating by 1°C increases fuel consumption by 6-10%. Overheating by 3 or 4°C is not unknown.
- Make sure that both the caretaker and the School Energy Manager understand how the heating controls work. This means being able to maintain them, and operate them efficiently.
- Discourage the use of portable electric heaters; they can be a very expensive form of heating. If you are on Maximum Demand tariff (see box on Maximum Demand), leaving a 3 kW electric heater on for just half an hour, at a critical time in winter, can add over £50 to your electricity bill if your MD is exceeded.

The boiler room

Saving money in the boiler room is largely a matter of routine and good practice both in operation and maintenance. The most important aspects are firstly, to make sure the controls are well understood and correctly set, and secondly that the boilers are regularly maintained. Whoever maintains the boilers should be adequately trained. They should know how to:

- check the combustion efficiency and flue gas temperatures of the boilers
- sequence the boilers (where possible) to work at optimum efficiency. In mild weather it is more efficient to have one boiler firing continuously than two or more cycling on and off at low load.

Your Local Authority should be able to advise you on suitable training or competent heating contractors. Many Local Authorities have Energy Management Units who can offer specialist advice, as can independent consultants.



Make sure that both the Caretaker and the School Energy Manager understand how the heating controls work.

Temperature checklist

Type of room	Air Temperature
GENERAL EDUCATION	
Classrooms & dining areas	18°C
Assembly/multi-purpose halls	14-18°C
Gymnasium & sports hall	14°C
Changing rooms & showers	18-21°C
Medical inspection room	21°C
Secretarial, admin. & staff rooms	18°C
Corridors/circulation	15-18°C
Toilet areas & cloakrooms	15°C
SPECIAL EDUCATION	
Teaching area	19°C
Staff rooms & common rooms	19°C
Corridors/circulation	19°C
Low activity children areas	21°C
Unclothed areas	21°C

Notes

Temperatures taken from DES Design Note 17, **Guidelines for environmental design and fuel conservation in educational buildings** and the DES guide **"Designing for the severely handicapped"**.

KEY

Against each **Handy Hint** is one of the following logos that suggests who might be responsible for carrying it out.



Activity to be carried out by all staff and pupils



A suitable job for the Form Energy Monitors



The School Energy Manager should organise these checks



Jobs likely to be the responsibility of the caretaking staff.

Handy Hints



Only use portable electric heaters as a last resort.



Don't place obstructions in front of heaters and radiators. This reduces their effectiveness and efficiency.



Report areas that persistently suffer from overheating. (Correct by balancing radiators, and by adjusting any thermostat settings, if fitted).



Check room temperatures and thermostat settings regularly.



Check the time clock to make sure the heating is not left on all weekend (also check by reading meters on Friday evening and Monday morning).



Check that the filters in fan convector heaters are cleaned regularly.



Check that rooms don't suffer from overheating. An increase of only 1°C in a room's temperature will increase its heating bill by 6-10%.

Swimming Pools

If your school has a heated swimming pool, you need to take particular care in controlling the temperature of its water. A pool is expensive to run because it has to be continuously heated. The temperature of the pool's water is the main factor that governs the amount of energy it uses. Keep a close check on this, or it can quickly consume money you've earmarked for other purposes. For example, in a large comprehensive school, a small, poorly controlled pool can cost more to heat than the whole of the rest of the school. Even in schools where the pool's temperature is under better control, it is still likely to consume about a quarter of the school's energy use overall.

A regular check on your pool's water and air temperatures could form part of a science project (bear in mind that the pool will take time to warm up or cool down). The two processes that dominate energy use in any indoor pool are the evaporation losses from the pool surface and the ventilation losses from extracted air. These two are interlinked. In simple terms, evaporation, and hence condensation, are both minimised by keeping the hall air temperature approximately 1°C higher than the water temperature. If the water temperature is higher than necessary you are likely to add to your energy costs twice — a **higher** water temperature requires a **higher** air temperature.

The proper control and operation of swimming pools is a specialised topic and further guidance is being prepared in this series of Best Practice Guides.

Routine use of a cover is an effective way to reduce your pool's energy costs. As a minimum, put the cover in place every evening and only remove it just before use. It is also worth putting the cover on your pool over lunchtime and even between lessons, if this can be achieved without incurring extra staff costs. The savings from using a cover on a heated outdoor pool are even greater than for an indoor pool.

Failure to use the pool cover diligently could raise your energy costs by as much as 50% (the cost of a pool cover can often be recouped in less than one year).


School Cleaning

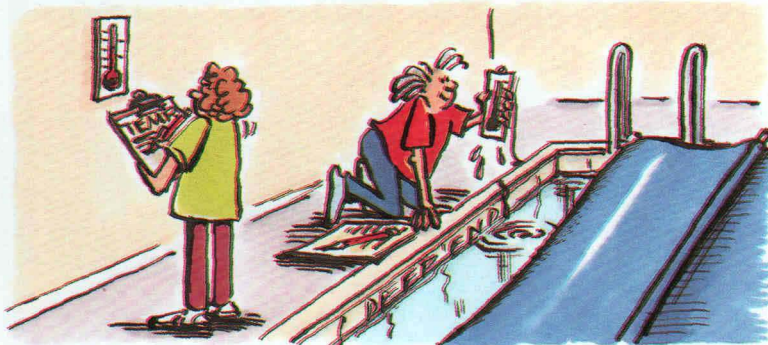
Whenever possible, cleaning should be carried out immediately before or after the school is occupied, then the pre-heating or residual heat can be used to provide adequate background heating. During the heating season, if cleaning has to be done at other times, it can prove expensive to heat the whole building for a small number of people.


Cleaning staff should be asked to keep windows and doors (including internal ones) closed at all times. This is particularly important if cleaning is done during the pre-heating period when the heating system is bringing room temperatures up to comfort level.

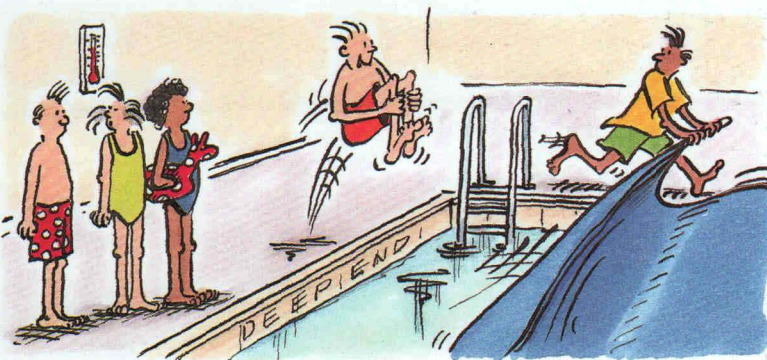
Cleaning staff should also be asked to limit their use of electricity by switching lights on and off as they move from room to room.


Handy Hints

 Don't operate your pool at high temperatures, or you will pay a high cost penalty.






 To help keep your pool costs under control, record water and air temperature several times a day in a log book. If temperatures are too high, pursue corrective action.




 If you have a swimming pool, whether indoors or outdoors, fit a cover and use it diligently.


Handy Hints

-  Whenever possible, don't run the whole school system to provide hot water for cleaning.
-  Keep doors and windows shut, especially when cleaning during the pre-heating period.
-  Ask cleaning staff to switch lights off as they move from room to room.



 Limit cleaning to the early pre-heating or post-occupancy residual heat periods.



 Limit the use of electricity for lighting to the area actually being cleaned.

Lighting and Electrical Power

Daytime electricity is expensive, so reducing electricity consumption should be high on your priority list. If you still have the older 38mm diameter fluorescent tubes in fittings with the 'starter' switch on the side, replace these with the higher efficiency 26mm diameter tubes as and when the former expire or as part of routine maintenance. They cost no more, but use 10% less electricity.

Consider replacing tungsten light bulbs with compact fluorescent lamps. The higher initial cost of these lamps is more than offset by 75% lower electricity costs. Overall running costs are about half those of tungsten light bulbs. Note, however, that in some secondary schools, pilferage of compact fluorescent lamps has occurred where fittings are readily accessible and unenclosed.

It is a myth that it is cheaper to leave lights on (e.g. over playtime) than to switch them off. Lights in unoccupied rooms should always be switched off (unless they are only going to be off for a couple of minutes).

Make use of daylight wherever possible. Where lighting is necessary and light switches allow, switch perimeter lights nearest the windows off and only use those in the deepest and darkest part of a room. Where lighting quality is concerned, you may wish to seek specialist advice.

Maximum Demand (MD)

Most large primary schools, secondary schools and colleges of education are charged for electricity on a 'Maximum Demand Tariff'.




This is a method of charging based on the greatest "peak" demand for electricity supplied each month, and is in addition to the normal unit and standing charges. The highest MD charges are in November, December, January and February. During these months, additional units consumed can, in effect, cost more than 100 times their basic cost.

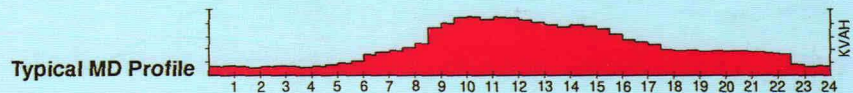
Your Maximum Demand is measured at half hourly intervals. During each half hour interval your greatest "draw off" of electricity is recorded. If it exceeds the previous maximum, your meter will indicate the new Maximum Demand value. In addition to MD-related

charges throughout the year, a monthly standing charge ('availability charge') is levied based on the peak demand recorded during the previous year. So it is in your interest to maintain a low MD all year round.







Peak electrical demand is likely to occur when a large proportion of the electrical lighting is on and other heavy loads like pottery kilns, home economics appliances, and school meals equipment occur at the same time. If care is exercised in operating electrical equipment during the winter months, substantial financial savings can be made. As an example, the use of pottery kilns just before the Christmas holiday can prove to be expensive, since it is likely to increase the MD during the December period when other demand is high.

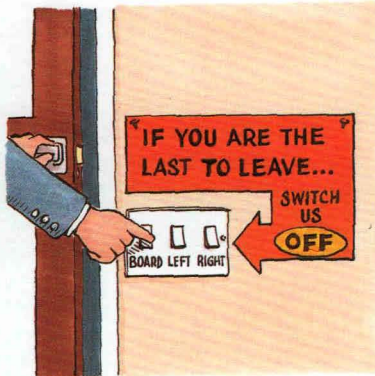
Handy Hints


-  Switch off all the electrical items you can at peak consumption times (usually mid to late morning) in winter months.
-  Check the Maximum Demand meter at regular intervals to see that the Maximum Demand reading doesn't keep increasing.
-  Consider how you can schedule the use of energy intensive equipment to minimise MD charges; plan the use of kilns, cookers, wood or metal work equipment (the fitting of time clocks may be an option).

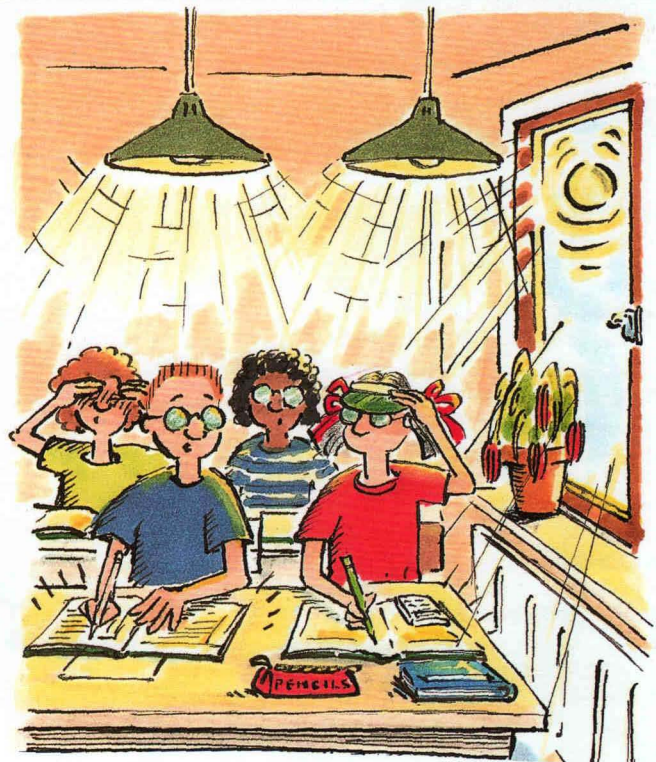



Handy Hints

-  Make use of daylight whenever you can.
-  Switch off electrical equipment when it is not being used.
-  Switch off computers when they are not going to be used that day.
-  Make someone responsible for switching lights off at break times and at the end of the school day.
-  Keep rooflights, windows and light fittings clean.
-  Check that any locally controlled extractor fans (e.g. washing areas) are switched off overnight and at weekends.



-  Always switch lights off whenever you leave an unoccupied room (for more than a couple of minutes).



-  Switch off lights when daylighting is adequate — electricity is the most expensive fuel, both to you and to the environment.

Ventilation

Excessive and uncontrolled ventilation is often the largest source of avoidable wasted heat in a school — it can account for 60% of total heat loss. Hence one of the most important contributions that occupants can make towards reducing heating costs and greenhouse gas emissions is to avoid unnecessary opening of doors and windows during the heating season.


Up to half the money spent on heating a room is used to warm incoming fresh air. Heating systems are usually sized to be able to heat roughly twice the volume of air in a room up to the required temperature every hour (i.e. to cope with a ventilation rate of 2 air changes per hour). Doubling this ventilation rate can increase your heating costs by 50%.







If you have extractor fans fitted in areas prone to high humidity (e.g. kitchens and shower rooms) these should be used, but only when the potential for condensation arises.

Remember, it is 'excessive and uncontrolled' ventilation that you are trying to avoid. Some fresh air is essential for a healthy environment in your school.

Handy Hints



 Don't open windows to cool a room — turn down the heating instead.

-  Don't leave outside doors and windows open when the heating is on.
-  Use inner and outer doors in draught lobbies as a "heat lock" when going in and out.
-  Remember extractor fans extract heat as well as air — turn them off as soon as they're no longer needed.
-  Check that outside doors and draught lobby doors close properly, including self-closing mechanisms.
-  Replace worn or damaged draughtseals before the heating season starts.
-  Keep a supply of replacement draughtseals in stock.

Hot and Cold Water





The water supply to most schools is metered. The more water you use, the more it costs. So it pays to attend to leaks and dripping taps promptly. Undetected leaks on underground mains can easily cost several hundred pounds a month, so regular checking of meter readings is important, especially following cold and frosty weather. Meter readings before and after unoccupied periods, will help detect leaks.

It is often worthwhile to fit flow restrictors to taps serving wash basins. These help to reduce water consumption, while still providing an adequate flow for hand washing.

If your main heating boilers are used to provide hot water in the summer there may still be ways of saving energy. For example, it may be possible to shut down all but one boiler or to use special controls to improve the efficiency. You will need expert advice to ensure that this is done safely.

Precautions should be taken to avoid any risk of legionella. Guidance on commissioning and maintenance procedures to minimise the risk of Legionnaires disease in building services is contained in Technical Memorandum 13 available from CIBSE (Chartered Institution of Building Services Engineers), Delta House, 222 Balham High Road, London SW12 9BS. Take advice from the Energy Management Unit or an independent consultant on this aspect.

Handy Hints

-  Don't leave taps running unnecessarily.
-  Report dripping taps promptly, and check they have been fixed.
-  Check tap and storage temperatures regularly.
-  Turn water heaters off at weekends and during holidays.



 Turn off unattended taps and showers.

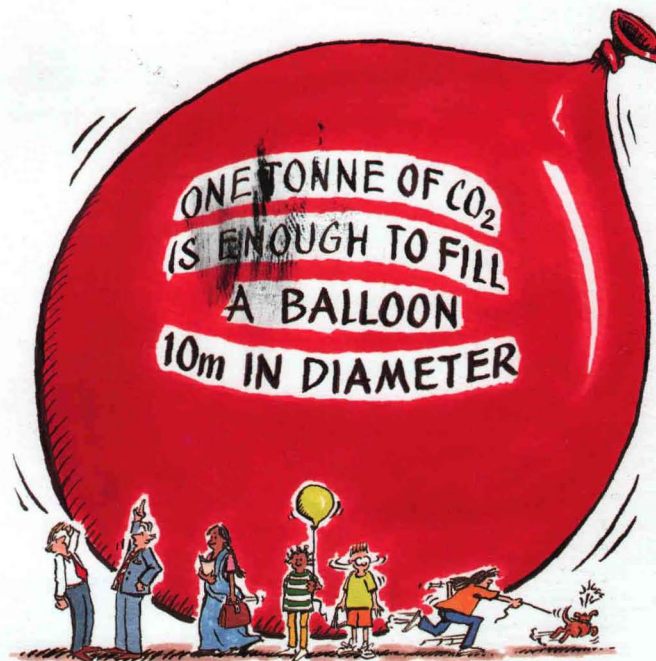
Energy and the Environment — Some Useful Facts

Every £80 of electricity (at 6.75p/kWh), or £77 of gas (at 44.3p/therm), or £54 of heating oil (at 14p/litre), or £40 of solid fuel (at £115/tonne), each produce 1 tonne of CO₂!

Conversion factors:

1 therm of gas = 29.3 kWh
1 litre of heating oil = 10.8 kWh
1 tonne of coal = 8250 kWh approx.

A 70m² classroom contains about 6kg of CO₂ naturally in the air. The energy used to provide heating, lighting and power to that classroom for one year would produce about 4000kg (4 tonnes) of CO₂. As a consequence of the fuel consumed by all the UK schools, some 6 million tonnes of CO₂ are produced annually.



IT PAYS TO BE ENERGY FRIENDLY

SUMMARY OF KEY POINTS

SAVE ENERGY

SAVE MONEY

PROTECT THE ENVIRONMENT

- Check room temperatures and thermostat settings regularly ☐
- Report areas that persistently suffer from overheating. A 1°C rise in temperature increases the heating bill by 6-10%. ☐
- Ensure that all the timeclocks and controls you have are working and are correctly set. ☐
- Check that the water heating does not come on all weekend. Turn water heaters off at weekends and during holidays. ☐
- Don't leave outside doors and windows open when heating is on. ☐
- Attend to water leaks and dripping taps promptly. ☐
- Avoid high Maximum Demand charges from use of heavy electrical equipment in winter months. ☐
- Switch off lights when rooms are unoccupied (e.g., during break times). ☐
- Switch off lights when daylight is adequate. ☐
- Ask cleaning staff to switch lights off as they leave each room. ☐

The Building Research Establishment's Energy Conservation Support Unit

(BRECSU), working with the Department of Education and Science, is preparing further guidance material on energy efficiency in schools as part of the EEO's "Best Practice Programme".

For further information contact: Enquiries Bureau on 0923 664258 for details of availability.

These include:

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| ECON 15 | Saving Energy in Schools — The Headteacher's and Governor's Guide to energy efficiency. |
| ECON 16 | Saving Energy in Schools — The "School Energy Manager's" Guide to energy efficiency. |
| GPG 39 | Managing Energy in Schools — A Guide for Headteachers and Governors. |

Further copies of this leaflet can be obtained from:

Further information on this or other buildings-related projects, please contact: Enquiries Bureau, Building Research Energy Conservation Support Unit (BRECSU), Building Research Establishment, Garston, Watford, WD2 7JR. Tel No. 0923 664258. Fax No. 0923 664097.

For further information on industrial projects, please contact the Energy Efficiency Enquiries Bureau, Energy Technology Support Unit (ETSU), Building 156, Harwell Laboratory, Oxon OX11 0RA. Tel No: 0235 436747. Telex No: 83135 . Fax No: 0235 432923.